INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior

National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
Exp. Date (11/30/2010)
Form No. (10-226)

Reporting Year:	**Park:**	**Select the type of permit this report addresses:**
2009	Shenandoah NP	Scientific Study

Name of principal investigator or responsible official:	**Office Phone:**
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Project Title (maximum 300 characters):

Controls on mercury dynamics during storm events within mid-Appalachian forested headwater catchments: interactions with organic carbon

Park-assigned Study or Activity #:	**Park-assigned Permit #:**	**Permit Start Date:**	**Permit Expiration Date:**
SHEN-00359	SHEN-2008-SCI-0021	Nov 05, 2008	Sep 30, 2010

Scientific Study Starting Date:	**Estimated Scientific Study Ending Date:**
Nov 05, 2008	Sep 30, 2010

For either a Scientific Study or a Science Education Activity, the status is:	**For a Scientific Study that is completed, please check each of the following that applies:**
Continuing	__ A final report has been provided to the park or will be provided to the park within the next two years __ Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park __ All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed

Activity Type:

Research

Subject/Discipline:

Water Quality

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):

This proposed research will investigate the physical and chemical controls on mercury (Hg) transport within catchments in Shenandoah National Park. A majority of Hg is transported downstream during high-flow events, and its mobility and toxicity have been shown to be coupled with organic carbon (OC). Understanding factors regulating Hg transport and interactions with OC is essential to assess the downstream fate of Hg and address concerns about current and future contamination. The main objectives of the project are: (1) to quantify particulate and dissolved Hg and OC fluxes in stream water during storm-events and investigate Hg-OC

dynamics, and (2) to quantify particulate and dissolved Hg and OC fluxes in stream water during baseflow and investigate Hg-OC dynamics. The ultimate goal is to further the understanding of Hg dynamics within the greater scientific community, as well as to provide important information about Hg controls in this region. SHEN resource management officials may use our findings to determining the most effective Hg sampling protocol as well as to determine the relevant concerns to downstream waters.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):

During the 2009 calender year approximately 75 - 80 stream water samples were taken from each of three sites within the Park representing a hydrologic and chemical gradient; Paine Run, Staunton River, and Piney River. Samples were taken manually during base flow every 2 weeks and bi-hourly by automated ISCO samplers during some storm flow conditions. All samples were analyzed at the University of Virginia lab for particulate and dissolved mercury (Hg) concentrations, dissolved organic carbon (DOC), UV absorbance at 254 nanometers, and pH. Data will be used to determine the amount and form of Hg exported from these watersheds on an annual timescale and to evaluate relationships between physical and chemical parameters and Hg export from these mountain watersheds. Analysis and findings will be reported after the end of the field sampling period/water year in September 2010.

Additionally, 3 water quality sondes were installed at each of the same sites to monitor pH, turbidity, temperature, dissolved oxygen, and conductivity at shorter time scales (hourly or bi-hourly) in late October, early November 2009. Sonde data has been downloaded for the 2009 year and will be analyzed at the end of the data collection period/water year September 30, 2010.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?

No

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	**Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):**
$0	$5000

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:

Paperwork Reduction Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average 1.625 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms. Direct comments regarding this burden estimate or any aspect of this form to Dr. John G. Dennis, Natural Resources (3127 MIB), National Park Service, 1849 C Street, N.W., Washington, DC 20240.